

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently amended): A method of controlling the crystalline structure of ingots and castings of ferrous and non-ferrous metals, in which a melt is crystallized in helically traveling magnetic fields excited by m-phase systems of alternating currents, the method comprising:

providing inductors positioned around a metal melt;
applying ~~a train of~~ m-phase systems of alternating ~~hierarchically frequency- and amplitude-~~ modulated currents (hereinafter SuperWaves) ~~modulated in a superwave pattern~~ to the inductors positioned around the melt to excite ~~hierarchically frequency- and amplitude-~~ modulated helically traveling magnetic fields in the melt.

Claim 2 (Currently amended): A method of controlling the crystalline structure according to claim 1, wherein said m-phase systems of alternating currents (SuperWaves) are periodically switched on for a certain time interval and switched off with a certain time interval.

Claim 3 (Currently amended): A method of controlling the crystalline structure according to claim 1 or 2, wherein amplitude ~~modulation depth~~ and frequency ~~deviation~~ (SuperWaves parameters) ~~of each pulse in the cluster of pulses~~ are periodically changed in time.

Claim 4 (Currently amended): A method of controlling the crystalline structure according to claim 1 or 2, wherein amplitude ~~depth~~ and frequency ~~deviation of each pulse in the cluster of pulses are increased~~ grow with increasing thickness of the crystallizing solid phase.

Claims 5-31 (canceled)